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8852. **Stannic Chloride.** [7646-78-8] Tin tetrachloride; fuming spirit of Libavius. Cl_4Sn; mol wt 260.52. Cl 54.43%, Sn 45.57%. $SnCl_4$. Improperly called *"tin bichloride"*.

Fuming, caustic liquid. d 2.26; mp −33°; bp 114°. Sol in water and evolution of much heat; sol in alcohol, carbon tetrachloride, benzene, toluene, acetone, kerosene, gasoline. *Keep tightly closed.*

Pentahydrate. White or slightly yellow crystals or fused small lumps; slight HCl odor. Very sol in H_2O; sol in alc.

Caution: May be highly irritating to eyes, mucous membranes.

USE: As mordant; reviving colors; stabilizer for colors and perfumes in soap; in dyeing of fabrics, weighting silk, tinning vessels; dehydrating agent in organic syntheses; in ceramics to produce abrasion-resistant or light-reflecting coatings.

8853. **Stannic Chromate(VI).** [38455-77-5] Cr_2O_8Sn; mol wt 350.69. Cr 29.65%, O 36.50%, Sn 33.85%. $Sn(CrO_4)_2$.

Brownish-yellow, cryst powder; dec when heated. Sol in water.

USE: Decorating porcelain and china in rose and violet colors.

8854. **Stannic Fluoride.** [7783-62-2] Tin tetrafluoride. F_4Sn; mol wt 194.70. F 39.03%, Sn 60.97%. SnF_4. Lewis acid. Prepd from $SnCl_4$ and HF: Ruff, Plato, *Ber.* **37,** 673 (1904); or from stannous fluoride and chlorine or bromine: Forbes, Anderson, *J. Am. Chem. Soc.* **67,** 1911 (1945); from stannous oxide or sulfide and fluorine: Haendler *et al., J. Am. Chem. Soc.* **76,** 2179 (1954). *Review:* Kemmitt, Sharp, *Advan. Fluorine Chem.* **4,** 185-186 (1965).

Snow-white, tetragonal crystals. Very hygroscopic. d_4^{19} 4.78. Sublimes at 705°. Hydrolyzes readily, but is more resistant to water than stannic chloride. Forms complexes with donor molecules.

USE: Friedel-Crafts catalyst.

8855. **Stannic Iodide.** [7790-47-8] Tin tetraiodide. I_4Sn; mol wt 626.33. I 81.05%, Sn 18.95%. SnI_4. Toxicity data: Salant, *J. Pharm. Exp. Ther.* **43,** 515 (1931).

Yellow to reddish crystals. d 4.46. mp ∼ 143°; sublimes at 180°. bp 340°. Dec by water; sol in alcohol, benzene, chloroform, ether, carbon disulfide. MLD in rats (mg/kg): 200 (Kolmer).

8856. **Stannic Oxide.** [18282-10-5] White tin oxide; tin dioxide; stannic anhydride; flowers of tin. O_2Sn; mol wt 150.71. O 21.23%, Sn 78.77%. SnO_2. Occurs in nature as the mineral cassiterite. The commercial grade is also known as *polishing powder, putty powder,* or *tin ash.*

White or slightly gray powder. d 6.95. Insol in water, alcohol, cold acids. Slowly sol in hot concd potassium or sodium hydroxide soln.

Caution: Potential symptoms of overexposure are stannosis (benign pneumoconiosis); dyspnea, decreased pulmonary function. See *NIOSH Pocket Guide to Chemical Hazards* (DHHS/NIOSH 97-140, 1997) p 308.

USE: Polishing glass and metals; manuf milk-colored, ruby and alabaster glass, enamels, pottery, putty; mordant in printing and dyeing fabrics; in fingernail polishes.

8857. **Stannic Selenide.** [20770-09-6] Tin diselenide. $SeSn_2$; mol wt 276.63. Se 57.09%, Sn 42.91%. $SnSe_2$. Prepd by passing the vapor of selenium over heated tin: Little, *On Selenium and Some of the Metallic Selenides,* Göttingen (Thesis, 1856); by treating a soln of stannic chloride with hydrogen selenide: Berzelius, cited in *Mellor's* vol. X, 785 (1930); by treating a soln of an alkali selenostannate or sulfoselenostannate with hydrochloric acid: Ditte, *Compt. Rend.* **95,** 641 (1882).

Reddish-brown crystals. d 5.133 (Little); d 4.85 [Schneider, *Pogg. Ann.* **127,** 624 (1866)]. mp 650°. Soluble in alkali, concd sulfuric acid, aqua regia, aq ammonia. Insol in water, dilute acids. Forms potassium selenostannate with potassium selenide; sodium selenostannate with sodium selenide.

8858. **Stannic Sulfide.** [1315-01-1] Tin disulfide; mosaic gold; bronze. S_2Sn; mol wt 182.84. S 35.07%, Sn 64.93%.

Golden leaflets with metallic luster; fatty feel to the touch. d 4.5. Insol in water or dil acids. Sol in aqua regia, in solns of alkali hydroxides or sulfides.

Note: The term "mosaic gold" is also used to designate an alloy consisting of 65.3% copper and 34.7% zinc.

USE: Gilding and bronzing metals, gypsum, wood and paper, usually by suspending in lacquer or varnish.

8859. **Stannous Acetate.** [638-39-1] $C_4H_6O_4Sn$; mol wt 236.80. C 20.29%, H 2.55%, O 27.03%, Sn 50.13%. $Sn(C_2H_3O_2)_2$. Prepd by refluxing granulated tin with 98% acetic acid: Colonna, *Gazz. Chim. Ital.* **35 II,** 224 (1905); by refluxing SnO with 50% (*v/v*) acetic acid under nitrogen: Donaldson *et al., J. Chem. Soc.* **1964,** 5942.

White, orthorhombic crystals; dec by water. mp 182.5-183°. d 2.31. Sol in dil HCl. *Keep well closed.*

USE: Reducing agent.

8860. **Stannous Bromide.** [10031-24-0] Tin dibromide. Br_2Sn; mol wt 278.52. Br 57.38%, Sn 42.62%. $SnBr_2$.

Yellowish powder; oxidizes in air. d 5.12; mp 215°; bp 623°. Sol in little water, gradually dec by much water; sol in alcohol, ether, acetone. *Keep tightly closed and protected from light.*

8861. **Stannous Chloride.** [7772-99-8] Tin dichloride; tin protochloride; Stannochlor. Cl_2Sn; mol wt 189.62. Cl 37.39%; Sn 62.60%. $SnCl_2$. Prepn: Stephen, *J. Chem. Soc.* **1930,** 2786; Williams, *Org. Syn.* coll. vol. **III,** 627 (1955). Metabolism and toxicity studies: M. Marciniak, *Acta Physiol. Pol.* **32,** 193 (1981); P. P. Singh, A. Y. Junnarkar, *Ind. J. Pharmacol.* **23,** 153 (1991).

Orthorhombic cryst mass or flakes; fatty appearance. bp 247°; d 3.95. Sol in water, ethanol, acetone, ether, methyl acetate, methyl ethyl ketone, isobutyl alcohol. Practically insol in mineral spirits, petr naphtha, xylene. LD_{50} in mice, rats (mg/kg): 1710.0, 2000.0 orally; 271.0, 316.0 i.p.; 34.8, 43.0 i.v. (Singh, Junnarkar).

Dihydrate. [10025-69-1] $Cl_2Sn.2H_2O$. Crystals; absorbs oxygen from air and forms insol oxychloride. d 2.71. mp 37-38° when rapidly heated; dec on strong heating. Sol in less than its own wt of water; with much water it forms an insol basic salt; very sol in dil or in concd hydrochloric acid; also sol in alcohol, ethyl acetate, glacial acetic acid, sodium hydroxide soln. *Keep tightly closed, in a cool place.*

USE: Powerful reducing agent, particularly in manuf of dyes and ^{99m}Tc radiopharmaceuticals; in tinning by galvanic methods; in liquor finishing of wire; in sensitizing of glass and plastics before metallizing; as soldering flux; as mordant in dyeing with cochineal; in manufacture of tin chemicals, color pigments, pharmaceuticals, sensitized paper, lubricating oil additives; as tanning agent; in removing ink stains; in yeast revivers; as reagent in analytical chemistry; as catalyst in organic reactions.

8862. **Stannous Fluoride.** [7783-47-3] Tin difluoride; Fluoristan. F_2Sn; mol wt 156.71. F 24.25%, Sn 75.75%. SnF_2. Prepd by evaporating a soln of stannous oxide in hydrofluoric acid in the absence of oxygen: Gay-Lussac, Thénard, *Mém. Phys. Chim.* **2,** 317 (1809); Nebergall *et al., J. Am. Chem. Soc.* **74,** 1604 (1952); from tin and hydrogen fluoride: Muetterties, *Inorg. Chem.* **1,** 342 (1962). *Review:* Kemmitt, Sharp, *Advan. Fluorine Chem.* **4,** 186 (1965).

Monoclinic, lamellar plates. mp 213°. d^{25} 4.57. Sol in water (about 30%). Forms an oxyfluoride, $SnOF_2$, on exposure to air.

USE: Dental caries prophylactic.

8863. **Stannous Hexafluorozirconate(IV).** [12419-43-1] Stannous fluozirconate(IV). F_6SnZr; mol wt 323.92. F 35.19%, Sn 36.65%, Zr 28.16%. $SnZrF_6$. Prepd from ZrF_4 and SnF_2: Muhler, US 3266996 (1966 to Indiana University Foundation).

Crystals. d 4.21. Sol in water.

USE: In anticaries preparations.

8864. **Stannous Iodide.** [10294-70-9] Tin diiodide. I_2Sn; mol wt 372.52. I 68.13%, Sn 31.87%. SnI_2. Preparation and crystal structure: Moser, Trevena, *Chem. Commun.* **1969,** 25.

Red, cryst powder or needles. d 5.28; mp 320°; bp 720° with decompn. Slightly sol in and dec by water; sol in solns of alkali